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Illuminating Engineering From the Architect's Standpoint*

BY WALDO S. KELLOGG

This paper will touch upon a few of the general features of interior illumination while attempting to outline the architect's interest and his relation to others interested in the same subject but from a different standpoint.

The high intrinsic brilliancy of most lights is largely, I think, responsible for an immense part of the light usually wasted. In figuring on a high theoretical efficiency the maker forgets that the dazzling effect of an unshaded light so blinds the eye that a much higher degree of illumination is required. In thus getting, for advertising purposes, a slightly higher theoretical efficiency practical considerations are lost sight of. If the maker of lamps considered the best interests of the consumer, rather than the seller of current or gas, well shaded lamps would be the rule and not special articles supplied reluctantly at a price calculaed to discourage their use.

The so-called 16-c. p lamp has become the generally accepted lamp, but recently the tendency seems to be toward more powerful lamps, not because there is a demand for them, but by reason of improvement in lamp efficiency. It was remarked above that manufacturers catered to distributors of light, hence to induce them to take up their lamps, new units are made up using the former amount of gas or current and a great noise is made about the intensity of illumination. If the public can get an inning, it may pay to advertise: We can give you the same light for half the money; instead of as now, for the same money; we can double your illumination.

There is no generally accepted standard lamp rating except such as best suits the eccentric distribution of the lamp for which at that moment some manufacturer is claiming the merits of all other lamps besides other virtues. The candle is a reasonably satisfactory unit of measure, but the rating of lamps in candle power should mean something and enable one to judge what the illuminating value really is. Spherical candle power rating is a fair basis of comparison, but the reflector lamps now being introduced and the devices for turning all the lights into the lower hemisphere seem to make the present prospects poor for the adoption of a logical spherical rating.

Until the spherical rating is adopted no one, except he is able privately to ascertain the true rating, is prepared to say that a certain intensity of illumination can be obtained by using a given number of lamps of one kind or a different number of another kind. If without means to get data, he must, to protect himself, put in outlets for two, and to be really safe, three times the number of lamps the manufacturer's rating in candle power calls for and the client is apt to complain of large lighting bills. It is in this necessity for protecting himself, that the architect lays the foundation for the unpopularity of the light distributor.

In all cases a lamp should be so constructed as to harmonize with its architectural surroundings. In a carefully designed building, the lamp, with as small a sacrifice of efficiency as possible, must conform to the architectural background. Thus, when a manufacturer professes to be unable to adopt a standard design to suit the architect's ideas, he must expect to be told that if such is the case the lamp will not be used, as considerations of efficiency are of less importance than the aesthetic ones.

The color of any light plays a more important part than some manufacturers like to believe. Man has become so accustomed to the warm glow of candles or similar light that in domestic work, he prefers a light of this color and a bluish white or greenish white light will be used only when a very strong light is needed. Women say that candle light adds to their natural attractiveness and with them in opposition the sickly light is very heavily handicapped.

The architect is employed to make a structure both convenient and beautiful and in doing this it is often necessary to sacrifice the so called practical considerations for others of an aesthetic nature naturally of great importance in the practice of a fine art.

*A paper read before the Illuminating Engineering Society, New York.

The Electrical Salesmen's Association.

The General Advancement Committee of the Electrical Salesmen's Association has been carrying on a campaign of enquiry among the members, requesting suggestions as to topics for papers and for ideas looking to the upbuilding of a strong and dignified organization. The following is a partial list of the topics for papers suggested by members. Some interesting speakers have already been obtained: "On the Essentials to Be Kept in Mind when Approaching a Stranger for a Purely Business Interview;" "Arousing an Interest in Your Proposition;" "Securing Material for a Persuasive Talk"; "The Elements of Talking Convincingly with Logical Expression;" On the Elements of a Successful Impromptu Address Before an Assemblage Such as a Municipal Council or State Board;" Scientific Salesmanship;" The Proper Method of Criticizing Competitor's Arguments;" Choosing the Most Successful Time for an Interview and a Consideration of the Proper Time to Discuss the Matter of Terms;" Points to Be Avoided in Closing a Business Arrangement;" "On the Relation Between Character-Building and Business Getting Persuasion;" "Is a Salesman Born or Made?" "Practical Lines of Co-operative Work on the Part of Electrical Salesmen;" "The Pushing of Specialties;" "Salesmanship;" "Price as Compared with Quality as a Basis for a Sale of Electrical Goods;" "Requirements of an Electrical Salesman;" "The Course to Pursue in Soliciting the Business of a Prospective Customer;" "The Buyer's Side of the Question."

The Electrical Salesmen's Association has now a membership of 300, and is represented in Mexico, the Philippine Islands, Canada and England. The secretary, George H. Erich, 401 Monadnock Block, Chicago, Ill., will be pleased to receive communications from salesmen.

House Moving by Electricity.

A car of the Altantic City and Suburban Traction Company, of Atlantic City, N. J., was substituted for a horse as motive power in moving a dwelling recently. The span wires were taken down one at a time, and the trolly wire pulled to one side, sliding along the side of the house, two linemen taking down and putting up the wires as fast as the house was moved.

The Possibilities of Concrete Construction From the Standpoint of Utility and Art.*

BY WILLIAM L. PRICE.

It is not my purpose to dwell especially upon the use of cement in the purely engineering side of building, although I believe that its use in that direction is in its infancy—and the general problem of concrete for heavy foundation work and reinforced with steel for structural work, has been covered by experts in those arts.

The accepted use of reinforced concrete as a structural material does, however, open up a field in architectural design that has been little considered. We have, both here and abroad, a comparatively large number of concrete buildings which are structurally good, but in most cases they are treated merely as a skeleton on which a building apparantly of brick or stone is hung—a makeshift and a sham, whether the actual work is done by structural steel or a concrete frame developed therefrom.

But reinforced concrete used even as a skeleton offers opportunities for design not offered by any other material.

A steel frame building is no stiffer than its joints, and in buildings of greatly varying heights or loads allowance must be made in design to take up undistributed settlement, or serious cracking will result; while in concrete the building, if properly designed structurally, and properly built of proper materials, is a monolith.

In the Blenheim Hotel, at Atlantic City, we have an exaggerated case of uneven loading. The solarium is but two stories high, it covers an extent of 150 by 120 feet, it immediately joins the main structure which leaps at the juncture to twelve stories— a height to the dome of 155 feet—and next adjoining this mass is the main building, eight stories high, surrounded by outlying sun parlors and banquet rooms of two stories. And yet, in spite of this divergence in loads and the fact that this work was not all built at one time, there is not an eighth of an inch of settlement in any part of the building. A steel building on the same foundations would probably show at least three inches of settlement, and it would not be safe to count on less.

It is my opinion that a considerable area of this building could have the foundations washed out without damage to the structure, nor does the heaviest wind so far encountered cause a preceptible vibration, even of the highest part of the building. These facts are not new as facts in engineering, but as architectural facts and inspirations they have been largely ignored. But if the cement manufacturers will stand by the architects this will come. Any falling off, however, in the quality and reliable characteristics of cement will be fatal, as a concrete building is either the best or the worst of constructions, and primarily the cement is the vital point, so that the cement man's first business is with himself. But while his responsibility may end there, his interests do not. The best of cements may be improperly or dishonestly used, poor sand, poor stone, poor mixing and placing alike will damn the construction, and it is in this direction that the greatest danger lies, and this danger is an eminent one. If buildings are to be designed by incompetent or ill informed engineers and architects, no matter how much they know of design in other directions, the result will be disastrous, both to the cement men and to those among the architects who believe in the future and possibilities of cement.

It all looks so easy, just the building of boxes and the casting of concrete and steel in the molds, and where the law, or better, knowledge, does not protect us, all sorts of liberties are going to be taken, owing to the desire to save materials and the large factor of safety usually and properly allowed.

To illustrate, when bids were taken on the Allegheny City station of the Pennsylvania railroad a number of bids were received, varying considerably in amount, and, while the specifications called for 16,000 pounds stress upon the steel and 500 pounds on concrete, we found upon questioning the bidders that some of them had computed their steel as high as 22,000 pounds, and their concrete at 750 pounds. In fact, they were entirely frank about the matter, stating that there was no law in Allegheny on the subject, and that it was amply strong. Nor had they at all considered it incumbent on them to use the stone specified. Now, if this is to be the tendency of even large and reputable contractors, I can see grave dangers ahead, both from the effect of failures upon the public, and the passage of too stringent laws.

I turn from the dangers to the possibilities of the material architecturally. I can not see much sense in the use of concrete as a substitute for block building material, although it will probably have its place if it is frankly treated as concrete and not as imitation stone. But the possibilities of design in concrete used this way are those of its competing materials, stone, brick, and terra cotta, so that I shall not dwell upon that, but try to point out something of what seems to me to be its greater possibility as a plastic material.

In block building, whether of stone, brick, or other material, the joints are an essential element of building, and as such should become an essential element of design to be accentuated rather than hidden, and in all characteristic and good architectural design you will find recognition of this fact. Take, for instance, any of the classic orders or their modifications in the Renaissance, and you will find a frank succession of blocks and columns set upon plinths, or directly on basement wall, cap, abacus, freize and cornice, all built up stone upon stone with major joints marked by moldings, bands and ornaments, a logical built structure. But if we attempt to follow such a system of design in a plastic material, or even a material like wood, the results are disastrous to true architecture. The design becomes a matter of external form, not of the true expression of methods and materials used. Concrete is built with shovel and trowel, and its proper ornamentation should be either cast in molds as built or such as can be run or fashioned on the work, with the addition of such color ornament as may be obtained by the use of terra cotta or other protecting material used as wall copings, roofs, pier caps, etc., and such other flat color ornamentation as may be produced by the use of tiles, marble, glass, or other material which is evidently applied to the surface. It is evident that this would and should make a wide departure from classic forms and accepted styles, that it means in fact a new architecture, although it will not be necessary to abandon all precedent. We shall want walls, windows, and doors in any case, and must learn to build them in their accepted forms. But in a material so plastic the forms of openings and moldings may be expected to vary much from those necessary to an architecture dependent on arches and lintels. There is more to be learned in the Spanish, or Californian and Mexican varieties of Spanish, than any other accepted type. Their plastered walls, tile roofs, and wall copings suggest concrete more than they do brick, and their domes and curved pediments are already suggestive of plastic rather than block construction.

I may perhaps be permitted to refer to the Blenheim Hotel as an example of an attempt to carry out some of these thoughts. At least there is no suggestion of built structure in its simple wall openings, its exceedingly few and simple moldings, and its total lack of cornices. We have distinctly tried in it to use a solid wall pierced by the simplest of openings, in an effort to reduce to a minimum the chopped-up appearance common with buildings that of necessity have many windows and small unbroken wall spaces. We have attempted, even where the wall was broken still further by bay windows, to preserve this style of wall and have used the shadows thrown upon this broken surface by balconies, to give the relief usually obtained by ornamental cornices, and with the addition of a tile roof

*A paper read before the quarterly meeting of the Association of American Portland Cement Manufacturers.

and some beautiful color obtained with Mercer tile we have secured sufficient color and variety to make a building essentially plain in wall surface give a sense of richness not always obtained by the use of elaborate and expensive ornamental work in stone or terra cotta; and the use of a moderate amount of terra cotta where required for sills, copings, and other wall protection, has been made unusually important by modeling it in interesting and appropriate sea forms and coloring it a light green, by a glaze which has the additional advantage of destroying any semblance of stone and giving it a plastic character that seems appropriate to modeled ornament. It is along the line of simple and direct expression of the purpose and mode of construction of building that architecture grows when it is really growing, and cement in its manifold possibilities spreads before us a new field for the imaginative designer.

PERSONAL.

Mr. S. K. Colby, treasurer of Pierson, Roeding & Co., left last Thursday on a six-weeks' trip Eastward, where he will visit all of the factories represented by this concern. During this trip he will place very large orders for supplies and hasten forward goods already ordered. It is the purpose of Pierson, Roeding & Co. to carry in the future a larger stock than ever before, owing to the greatly increased demand on the Pacific Coast for their electric railway and transmission specialties.

Mr. Walter Robbins, assistant to the manager of the apparatus department of the Western Electric Company, of Chicago, has resigned his position with that company and will enter the service of the Wagner Electric Manufacturing Company, St. Louis, as assistant to the manager of that company. This change will become operative July 1st.

Mr. John D. Galloway, who has been so prominently identified with the plans for the rebuilding of San Francisco in connection with the Municipal Committee, the Engineers' Association and in his professional work in examining and preparing plans for many of the large buildings, will identify himself in partnership with Mr. John Galen Howard. The new firm will occupy the ninth floor of the Atlas Building, 604 Mission Street.

Mr. Jean Bart Holcomb, who before the fire had an office in the Rialto Building and subsequently acted as structural engineer for The Ferrolite Company, has just been appointed chief engineer of the Pittsburg Filter Manufacturing Company, of Pittsburg, Pa., engineers and contractors for municipal filter plants, one of the three large concerns of this kind in the United States.

Mr. D. E. Harris, formerly city sales manager of the John M. Klein Electrical Company, will in the future act as assistant to Mr. Goodwin in caring for the sales department ot the newly incorporated Century-Klein Electric Company. Mr. Harris will be located in their temporary San Francisco offices at 1310 Fulton Street, and will be pleased to meet all of his old customers at his new address and extend to them all of the old time courtesy and consideration.

The H. M. Byllesby Company, formerly at 171 La Salle Street, Chicago, have removed their general offices to the American Trust Building, corner Clark and Monroe streets, Chicago.

Mr. H. C. Baker, formerly in charge of the Atlanta office territory of the Crocker-Wheeler Company, in which capacity he became favorably known as an electrical engineer throughout the southern industrial field, has started for San Francisco, where he will take charge of the Pacific Coast territory of the Crocker-Wheeler Company. The offices at Fremont and Howard streets, San Francisco, were completely destroyed by the recent fire, but temporary offices have been established at 2611 Broadway. Mr. Baker will enter an active field of electrical development in which the company is already conspicuously established by its installation of 4000 kilovolt-ampere alternating current generators in the plant of the California Gas and Electric Corporation. These machines, the largest gas engine driven alternators in the world, escaped damage in the recent disaster.

Mr. W. J. Grady, sales manager of Faries Manufacturing Company, Decatur, Ill., "has arrived." He is one of the advance guard of Eastern manufacturers who will visit San Francisco and endeavor to secure their share of the enormous business which the electrical jobbers and wholesalers will enjoy during the coming year. Mr. Grady deserves an unusual share of this business, not only on account of his personal popularity, but because of his prompt appearance at this hustling center of trade.

Mr. E. M. Scribner, president of the California Electrical Works, left this week for a business trip to Los Angeles.

ELECTRIC HORN FOR MOTOR CARS.

No greater novelty in the automobile horn department has been received this season than the introduction of an electric horn, which takes the place of the bulb so generally in vogue on motor car. The rubber horn has its many disadvantages, notable among which is the removing of the hand from the steering wheel of the car to press the bulb. Drivers of cars are familiar with the difficulty experienced in operating the horn, a very quick pressure being essential to produce a tone, which is often attended with difficulty in cold weather. The electric horn introduces nothing new in the electric field, being designed according to accepted principles.

The sound-producing medium is a vibrating diaphragm, the same as used in the telephone. To vibrate the diaphragm an electric magnet is required. Two wires from a small storage battery connect with the coil windings of the electro-magnet and a vibrator serves to make and break the current The vibrations of the vibrator are communicated to the diaphragm through a small plunger rod which is shown surrounded by a coil sprnig, Each time the circuit in the electro-magnet is completed, the vibrator is drawn toward the magnet and the push rod thrust against the diaphragm, but immediately the circuit is broken, the vibrator falls back and the coil spring pulls the plunger rod away from the diaphragm.

THE TROLLEYMEN'S CLUB.

There has just been opened, on the second floor of the great Huntington car-barn buildings on East Fifty-fourth street, Los Angeles, commodious, well-lighted, social apartments for the use of the trolley men.

The apartments have been arranged with special care for the comfort of the men. The lounging room is ideal, and invites the weary railroader to an hour of rest and ease. There is naught to distract and everything to please. If he is so inclined he may play billiards or pool on the best Brunswick Balke tables. Many other games are provided for the amusement of the men.

There is a well stocked library, already well patronized, and a reading room. An assembly-room is provided, and the men propose to hold debates, and concerts, as well as meetings to discuss ways and means for the betterment of their social conditions.

MIS-USE OF ELECTRICAL ENGINEER'S TITLE.

There seems to be a regrettable tendency among a class of so-called electricians to appropriate that which does not rightly belong to them, says "Electricity" of New York. We refer to certain men capable of stringing a wire and connecting up a bell who deliberately place the letters E. E. after their names presumably with a view to instilling confidence into prospective clients. As we all know it take usually four years of hard study to possess these two little letters E. E., and why therefore should a man who has taken a correspondence school course or learned a few things electrically in a factory or shop be allowed to coolly appropriate the title without a word being raised in protest?

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EDITORIAL

Courage and Persistence.

Or, as the Scriptures say, Faith and Works.

This is a combination essential to success. It is not enough to believe, but one must work out his own salvation. Faith in one's city is good, but this is only the axiom; we require the demonstration.

The courage which caused the San Franciscan to stand at his post and proclaim his belief that a greater city would arise from the ruins, won for him the plaudits of the world. But this courage is like a flash in the pan if it is not joined to that resolute and dauntless persistence which knows no halting, suffers no reaction, and permits no defeat.

"Everlastingly keeping at it" will bring success. The course may be full of hurdles (*i. e.* insurance complications, contractors' delays, tardy shipments, slow collections, and inadequate business facilities); but with this same good team of Courage and Persistence we can leap over them all. The cheers of our friends will not win for us the race, but they will urge us on to the effort that will secure the victory.

If General Grant was alive he would say, "Let us fight it out on this line if it takes all Summer—and Winter," It will be a long fight. Let us bring into the contest the unfailing qualities of cheerfulness, consideration and contentment. Do not run the pace that kills; but keep up the steady and persistent gait which we can continue to the end. Then we shall have both health and strength to enjoy the fruits of our victory.

An Insurance Opinion.

Viewed from any standpoint, says the *Insurance Engineer*, New York, the one particular lesson which should engage the attention of the San Francisco builders in particular and other cities in general, is carefully proportioned concrete. The effects of both the earthquake and the fire point unmistakably to this form of construction as perhaps the very best. But so far as San Francisco is concerned this construction must enter into all walls, all floors, all partitions, and all flat roofs or those of low inclination. Further, in all large buildings, certain partition walls should be carried up continuously from basement to roof, and generally so arranged as to subdivide the structure into square or rectangular compartments. The time is now particularly opportune for a commission of engineers and architects to revamp San Francisco's building laws.

Notice to Subscribers.

We request each of our subscribers to send us his name and address and date of last payment; also copy of receipt therefore, in order that we may compare same with such of our records as were saved from the fire and avoid any possible errors or omissions. Also, all San Francisco subscribers should send us their new addresses in order to facilitate prompt delivery through the post-office.

Back Numbers of "The Journal."

If you have any and can spare same we would request that you forward them to our office, Atlas Building, San Francisco. We have constant need of back issues of THE JOURNAL, and as our reserve copies (including our bound volumes) were entirely destroyed by the fire, we must depend upon the kindness of our friends in replacing same.

Plans for the Chicago Telephone Convention.

From the headquarterrs of the National-Interstate Telephone Association in Cleveland, announcement is made that an exceptionally interesting program is being prepared for the convention to be held in the Auditorium Hotel, Chicago, June 26 to 28. There will be some valuable papers by experienced men, and the Question Box will be given special attention. Besides, matters of importance to the rapidly growing Independent telephone movement will come up for discussion and settlement. The standing committees will submit reports which will be of interest to all telephone men.

An informal banquet will be given at the hotel on the evening of June 27. This is only one of the entertainment features. The manufacturers and supply men, who are cooperating with the association, will have large exhibits of the latest devices and appliances. The hosts are also planning pleasant diversions for the delegates between meetings.

Reduced rates under the certificate plan have been secured on all railroads. Full-fare tickets, with a certificate signed by the agent, should be purchased to Chicago by the delegates. The certificates, upon being deposited at the convention headquarters, will entitle the holder to a return ticket for one-third regular fare. The association will give prizes for the best photographs of Independent plants exhibited at the convention.

A New Steam Turbine.

A new steam turbine has recently been put on the market in Germany. It is a compromise type between the high speed DeLaval turbine and the multiple stage Parsons type. It has only one running wheel up to 100 horsepower, except that it may be compounded by the use of two running wheels, and these have comparatively few buckets. On account of the method of applying steam to the turbine, the speed is comparatively low for its size.

Trade Catalogues.

Allis-Chalmers Publications—Bulletin No. 1706, "Log Machinery." This gives illustrations and descriptions of their log jacks, log chain brackets, log kicker or roller and other lumber mill machinery. Bulletin No. 1050, "Alternating Current Generators, Water Wheel Type." This bulletin is especially valuable for its description of the Allis-Chalmers-Bullock generators, giving accurate data of output, speed and voltage of these machines by carefully prepared tables. Bulletin No. 1700, "Band Mills, Single Cutting and Double Cutting, and Their Appliances." This gives a full description of their band mills, including their new Allis telescopic band mill, together with table of dimensions. Allis-Chalmers Company issue other bulletins on the same subject, Nos. 2005–6, any of which may be secured by writing to the Department of Publicity, Milwaukee, Wisconsin.

Electric Hoists—The Wellman-Seaver-Morgan Company, of Cleveland, Ohio, have issued an important bulletin on electric hoists, which includes descriptions of their line of Webster, Kamp & Lane steam operated hoists and haulages. Illustrations, dimensions, etc., of these hoists are given, together with tables of sizes and dimensions.

"Yale Scientific Monthly," May issue—This publication is issued by the Seniors of the Sheffield Scientific School of Yale University. This number contains articles on the "Financial Aspect of Railroad Location," "Some Evils Due to Steam Boiler Incrustation," "The Modern High Power Motor Boat," and other timely technical topics.

The Lafayette Electrical Manufacturing Company, of which the Standard Electrical Works, San Francisco, are Pacific Coast agents, have just issued a bulletin describing their latest type of Hornberger transformers. This gives tables of characteristics with comparison tests.

The Stanley G.-I. Electric Manufacturing Company, Bulletin No. 605, superseding No. 464, dealing with small direct current motors.

The electrical testing laboratories, Eightieth Street and East End Avenue, New York. Reprint of a paper presented at the American Institute of Electrical Engineers by Clayton H. Sharp, Ph.D., on "A Testing Laboratory in Practical Operation."

University of Wisconsin, Bulletin No. 129, Prospectus of Summer School for Artisans, beginning June 25th and continuing for six weeks, at Madison, Wis. The courses of study include engines and boilers, applied electricity, mechanical drawing and machine design, materials of construction, fuels and lubricants, shop work and manual training. The instructional force is taken from the regular faculty of the College of Engineering, and the entire laboratory and shop equipment belonging to the college is used by the students in the summer school.

Proceedings of the American Institute of Electrical Engineers, April, 1906, containing papers and discussions on "The Relation of Load Factor to the Evolution of Hydro-electric Plants," by S. B. Storrer; "Notes on the Design of Hydro-electric Power Stations," by David B. Rushmore; "Standardizing Rubber Covered Wires and Cables," by John Langan, and "Comments on Present Underground Cable Practice," by Wallace S. Clark.

The California Promotion Committee have issued announcements of the Fifth Annual Meeting of the Counties Committe, to be held in Napa on June 16th. They also issue a circular headed "San Francisco Dauntless," which they offer to furnish in quantities to any firm who will distribute same by enclosure in their business letters. They also ask for photographs of views in sections near San Francisco which will refute the exaggerated and incorrect account given as the results of the earthquake, and inform the people of the world as to the true conditions.

REPORT ON STANDARDIZATION RULES

The Committee on Standardization of the American Institute of Electrical Engineers after having worked for several months on the Standardization Rules with a view to bringing them up to date, has recently reported them in provisional form for criticisms or suggestions.

USES OF ASBESTOS

The housekeeper who first made acquaintance with asbestos as a stove mat, writes Aubrey Fullerton in "Technical World Magazine" for May, now uses it as a stove polisher, as a flat-iron holder, as a lamp wick, and as a fire pad under her gas burner. Most likely, too, her kitchen range is lined with it. Our dwelling houses are fire proofed with asbestos wall plaster, asbestos roofing material, and asbestos paint. In office buildings and factories, the steam pipes are overlaid with asbestos covering, and the boilers with asbestsos cement. Machinists use asbestos yarn or wick for packing piston rods and valve stems, and asbestos millboard as a joint packing. Electricians value it as a non-conductor.

The modern theatre has fire proof stage curtains of asbestos cloth, and the best equipped firemen wear asbestos uniforms. Storage rooms on ocean steamships are lined with asbestos, and it is equally servicable in the domestic refrigerator. Chemists find asbestos fiber the best niter medium; and because of its non-absorbing qualities, it is valued in hospitals.

Known to some extent in ancient Greece and Egypt, the existence and use of asbestos seem afterwards to have been forgotten until quite recent years. Since 1866 the Italian mines have been the chief source of supply in Europe, and until twenty-five years ago they were the only mines in the world. At the present time, however, asbestos is being mined in varying quantities in Russia, Australia and Africa, and most largely of all in America. It occurs in some nine or ten of the States, of which Georgia produces the largest quantity and Vermont the highest grades. But of the grades suitable for the highest class of manufacture—which, in other words, means the grades suitable for spinning and weaving—the province of Quebec has practically a world monopoly.

ELECTRICITY ON THE STAGE.

Ol. Perry, the Fort Wayne manager of the Western Union Telegraph Company for over tairty years, says the "Indianapolis News," tells a story of Oliver Dond Byron, the veteran actor, who recently gave a dinner to a party of friends in New York, which reminded Perry of the incident.

"Byron," said Perry, "was playing in Fort Wayne in a piece that called for a telegram informing the operator away ahead of the express train to stop the train, loaded with gold, as bandits where waiting to hold it up. In a dramatic situation Byron as the hero operator at one point clicks the instrument, and there is a strenuous pause to know if the message arrived in time. I was selected to send the message that would tell Byron his warning had been given and the engineer had been notified.

"He knew nothing about telegraphy and what he clicked off had no meaning, of course. At the proper cue I clicked off the words: 'Byron, you may be a good actor, but you are a blame poor operator.'

"There was a tremendous outburst of applaue over spots in the audience. It happened that there were a good many railroad men who knew the code in the audience, and when they heard the message they saw the point. It was a good while before Byron could proceed with the play without interruption, and he does not know yet what had caused the commotion."

HOTEL FOR TELEPHONE GIRLS

The telephone girls of Paris will soon be quartered in a new residential hotel which is being built for them by the postal authorities. They will be charged low rates for board, and it is expected that the institution will eventually become self-supporting, although it will be subsidized for the present. A receiving room, breakfast room and library are on the ground floor, and a large dining room, which will also be used for concerts and balls, on the second.

Industrial.

THE CENTURY-KLEIN ELECTRIC COMPANY, INC.

The recent fire and disaster has resulted in many pleasant consequences. One of these has been the bringing together in friendly relations of men who have formerly been active competitors. A notable example of this is the combination which heads this article.

The Century Electric Corporation and The John M. Klein Electrical Company have been among the foremost and largest jobbers and dealers in electrical goods on the Pacific Coast. The general managers of both companies, C. M. Wood of the Century Electric Corporation, and William L. Goodwin of the John M. Klein Electrical Company, have been warm personal friends for the past ten years, a friendship growing out of their association for several years with the sales department of the California Electrical Works. Both started in business on their own account and each found the other a lively competitor. The field was big and both companies prospered. During the recent few months, however, when both had their San Francisco places of business wiped out by fire and both were hunting new locations for their respective companies, the natural thought arose that two large companies, working on the same lines and covering the same territory, might lessen expenses, eliminate competition and increase business by associating themselves together. Accordingly the men actively engaged in both of these concerns were invited to join in forming an entirely new company to be known as the Century-Klein Electric Company, Inc. This new and important organization will take over the business, and, with few exceptions, the agencies of both companies, together with all the stock on hand and in transit. All of the employees of both companies will be retained by the new concern, and the greatest enthusiasm prevails throughout the entire force as to the prospects of an enormous business in the future. The capital will be $350,000. The new company starts free from indebtedness and in a strong financial condition.

The officers of the company are as follows: President, J. M. Greenwood; first vice president, A. G. Stoll; treasurer and general manager, C. M. Wood; second vice president, and sales manager, William L. Goodwin; secretary, E. T. Weihe.

Mr. Greenwood was formerly president of the Century Electric Corporation and is the manager of the Greenwood estate, which owns many of the most desirable sites in the down town district.

Mr. Stoll was formerly vice president of the John M. Klein Electrical Company and is president of the Main-Winchester-Stone Company, manufacturers of harness and saddlery.

C. M. Wood has for a long time been general manager of the Century Electric Corporation and will have the same position in the new organization. To his able management has been due, to a large degree, the success attained by the Century Company.

William L. Goodwin, was formerly general manager of the John M. Klein Electrical Company. He will act as second vice-president and sales manager of the Century-Klein Electric Company, Inc., and has already engaged a competent staff of assistants.

Mr Weihe was formerly secretary of the Century Electric Corporation, and will continue in the same position with the new concern. He has a large acquaintance and is deservedly popular with the electrical trade.

The Century-Klein Electric Company, will confine its business to that of wholesale jobbing of electrical supplies and will not engage in the contracting line. For the next thirty days their principal place of business will be at 34 Telegraph avenue, Oakland, but within a short time the new company will occupy their own building to be erected on the site which was formerly and is today the chief center of the electrical industry of San Francisco.

"The Journal" wishes a very large measure of success to the Century-Klein Electric Company, Inc. It is composed of men who have "won their spurs" in the electrical business and an aggregation of talent such as is here composed cannot fail to make a record for itself which will satisfy even its warmest friends and admirers.

A METHOD OF CONVEYING STEAM UNDERGROUND.

Some interesting work has in recent years been undertaken in the transmission of steam and hot water underground. In the past this undertaking has been attended with a very considerable loss of heat carried by radiation into the ground. It is nothing uncommon to see in mid-winter the ground over such pipes free from snow, even when there is a depth of several inches of snow elsewhere and green grass is sometimes observed in mid-winter in such cases.

The H. W. Johns-Manville Co. are now placing upon the market and installing sectional tile pipe conduit, which meets a long felt want in providing a conduit for pipes running underground which should thoroughly insulate and protect the pipes, and which could be installed for a reasonable cost. This is known as the "J-M" Portland Sectional Conduit, and consists of tile pipe made in top and bottom sections; this division being made by cutting half through the shell of the pipe before it is baked, and then breaking afterward, so that the joint is very much like that made in replacing pieces of a broken plate, the use of neat hydraulic cement making it possible to put these sections together when desired making practically a perfect looking piece again. As the top and bottom sections are numbered to correspond the same sections can always be mated, and thus a perfect joint is secured.

The support of the enclosed pipes is accomplished by supporting tee sections which are placed in the line of conduit from twelve to eighteen feet apart, depending upon the size of pipes enclosed. This supporting tee section is placed firmly on a bed of concrete which is carried up into the supporting tee section, the concrete holding the metal roll frame carrying the rods and rolls upon which the pipes rest, thus the entire weight of the pipes and their contents is entirely independent of the conduit itself, and it is so firm as to permit of any required weight and movement of the pipes without any injury to the conduit.

The conduit with supporting tees and roll frames are laid section by section until a line is completed, and then the pipes are put in place and tested, after which the insulation may be applied. This insulation may be of either the sectional pipe covering form, or what is more used and recommended is the asbesto-sponge conduit filling with which the entire remaining space in the conduit about the pipes is filled, thus providing the best and cheapest form of insulation. This insulation is applied while the top sections of the conduit is applied length by length.

It is customary to place under this conduit an underdrain to remove the surplus water, which would otherwise lie against the conduit and absorb the heat.

It has been found that if desirable to open the conduit after the installation is complete this is readily done. Certain features of this conduit are especially meritorious. The simplicity of the system is due to its few parts, each part being designed for its particular function. The pipes may be installed easier in this conduit than in other forms of conduit, and the insulation may be applied more easily, while the pipes can be gotten at for the purpose of repairing, if desired, as easily as any other form of conduit, except possibly the large tunnels, which are usually prohibitive on account of the cost.

The conduit is the most serviceable form of underground conduit known, because it is water, fire and acid roof; the conduit itself being indestructible, and no opening of the

joints is caused by any movement or weight of the pipes on account of the form of support provided.

With proper care in laying, the conduit is practically watertight. The cost of maintenance is nothing, no repairs being required by the conduit. This means constant service so far as the conduit is concerned.

The conduit provides for the greatest efficiency possible in the transmission of steam or hot water underground, because of the thorough protection given to the pipes, and the highly efficient system of insulation provided.

The conduit can be installed at a less cost than any other form of conduit, which is worthy of serious consideration. Careful tests have been made to determine the loss of heat in transmitting steam underground in this form of conduit. The most recent test which was made by Geo. H. Barrus, expert and consulting engineer of Boston, has shown that the loss of heat was less than that usually found in pipes installed in buildings with the best commercial grades of sectional pipe covering to be had in open market, which would seem the most satisfactory in view of the fact that the pipes installed underground are placed in a more difficult position because of the amount of water in the ground, and the lower temperature of the ground.

One reason for the greater efficiency of this method of transmitting steam underground is due to the fact that the pipes enclosed in the conduit, with the conduit filling for insulation, are protected against any movement of the air over the pipes, whereas in the large tunnels or brick tunnels with sectional covering applied the air is constantly moving over the pipes, and even when covered in the usual way there is considerable loss of heat due to this fact. No other form of underground conduit can be made reasonably watertight as can this one.

H. W. Johns-Manville Company, have issued an illustrated descriptive catalogue of this conduit which can be had on application.

THE USE OF LIMPID OIL WITH GRAPHITE WILL REDUCE FRICTION TO ONE-THIRD THAT OF THE ROLLER BEARING.

This statement seems to be justified by the following:

The October, 1905, issue of Machinery, contains a report of a series of tests on roller bearings, made by Professor C. H. Benjamin, at the Case School of Applied Science, which are of especial interest in view of certain results which have been obtained by Professor Goss, from plain bearings lubricated with kerosene and Joseph Dixon's Flake Graphite.

Professor Benjamin's experiments were made upon several different kinds and sizes of roller bearings in common use. The purpose of the experiments was to determine the friction developed by such bearings when run under different conditions of load and speed. The apparatus employed was similar to the well-known Thurston oil testing machine, and was in every way well adapted to the purpose for which it was used. Professor Benjamin's reputation as an experimenter, and the highly refined character of the apparatus he employed, leave no question as to the accuracy of his work.

In the results which were obtained by Professor Benjamin from the use of roller bearings 1 15-16 inches in diameter, in comparison with those obtained from the step bearing testing machine made use of by Professor Goss in connection with his study of graphite under similar conditions of pressure, it was demonstrated that the co-efficient of friction developed by the roller bearings was greatly in excess of that developed by the use of graphite and kerosene in a step bearing. Thus, when the pressure is 40 pounds per square inch, the co-efficient of friction for the graphite and kerosene is .00459, while the average co-efficient for the two roller bearings is .018, or 3.92 times greater. When the pressure is 50 pounds per square inch, the co-efficient of friction for the graphite and kerosene is .00442, and for the roller bearing .0175, or 3.95 times greater. There are no conditions which can impair the value of this comparison except that a higher speed was employed with the roller bearing than with that which was lubricated. But as the co-efficient of friction of the lubricated journal generally diminishes with increase of speed, a correction of this would make the differences in results greater. The step bearing was able to carry a load of 110 pounds per square inch, while the greatest load carried by the roller bearing was 61 pounds per square inch, or only 55.5 per cent. as much as that of the step.

Professor Benjamin also made tests of plain bearings and found that "the friction of roller bearings is less than that of plain bearings."

There is no secret in all this. The plain bearings experimented on by Professor Benjamin were undoubtedly lubricated with an oil possessing considerable body, whereas in the presence of graphite a very light oil will suffice. The friction of lubricated journals is largely a matter of viscosity of the lubricant. For any given service, the use of graphite will always present a reduction in the viscosity of the liquid lubricant and hence a reduction in friction. The extent to which such a change may be carried is, however, not commonly recognized. It is well illustrated by the fact that a graphite mixture, well designed for the service expected of it, gave results which leave the roller bearing quite distanced in the race.

BLAST FURNACE GAS ENGINE DEVELOPMENT IN PITTSBURG DISTRICT.

The Carnegie Steel Company has made a long step in the right direction by their recent adoption of gas engines to utilize the surplus gas from their furnaces for the generation of power needed in the electric driving of mill machinery. Some time ago the company contracted with the Westinghouse Machine Company, of Pittsburg, builders of large engines and turbines, for some large blowing engines to be driven by blast furnace gas. For the purpose of conducting preliminary experimental work, an engine of 350 horsepower, running at 150 revolutions with 30 inch stroke, was installed and has since made a remarkable record for itself under the severest possible tests for efficiency, reliability and durability. The two gas blowing engines, the largest ever built in this territory, are now under construction at East Pittsburg for the work at the Edgar Thompson Furnaces, Bessemer. These will be twin tandem units with Slick air blowing "tubs" arranged in front or vis a vis and with flywheel interposed between the two sides of the engine. Each of these blowing units will have a capacity of 25,000 cubic feet of free air per minute operating against a normal blast pressure of eighteen pounds and running at a speed of fifty to seventy-five revolutions per minute. When higher pressure is demanded by the furnaces the valve gear of the engine may be so altered as to deliver air under pressures up to twenty-five pounds per square inch in proportionately less quantity. These engines are of the heavy double acting type as standardized by the Westinghouse Machine Company and will be among the largest ever constructed for use with blast furnace gas.

Very recently the Carnegie Steel Company has contracted with the Westinghouse Machine Company for another blast furnace gas engine unit similar in design to the blowing units above mentioned, except that the engine will drive a direct connected electrical generator for the purpose of augmenting the present power service at the Bessemer Works. The gas engine will have the same stroke as the blowing unit, viz. 54 inch, and operating at a normal speed of seventy five revolutions per minute will develop approximately 2500 brake horsepower on blast furnace gas. The generator will be a 1500 kilowatt direct current machine connected in parallel with the other steam machinery at the present Edgar Thompson power plant.

The Carnegie Steel Company, by its utilization of surplus blast furnace gas for power work, has inaugurated this essentially modern practice in the Pittsburg District and further development is certain. The type of engine adopted is also very promising, as indicated by the service rendered by several engines of this type already in operation, notably those of the Warren and Jamestown Street Railway, Warren, Pa. where two 500 horsepower polyphase units are operating in parallel on an extremely severe interurban load.

TELEPHONE BATTERIES.

The Gould Storage Battery Company, of New York, has recently organized a special telephone battery department to look after their rapidly increasing business in storage batteries for telephone service. A corps of experienced engineers has been engaged to devote their entire time to this application of the battery.

The Gould Company is not a new comer into the telephone field. It was over three years ago that one of the most important telephone companies in this country placed their first order for a Gould Storage Battery as a trial installation, which was subsequently followed by orders for the similar equipment of six additional exchanges. The Gould plate has a large contact surface for active material which is developed out of the lead of the blank itself patented process of "spinning" the surface of the blank into numerous thin ribs. Only chemically pure rolled lead is employed, the great density and uniformity of which are prominent factors in securing the high economy and long life of Gould batteries.

The success of the storage batteries in replacing gravity and other forms of primary cells in the modern telephone exchange has been due to three factors: first, the less space occupied; second, less care and attendance required, and third, considerable savings in the cost of maintenance.

JOHN A. ROEBLING'S SONS COMPANY.

The John A. Roebling's Sons Company is building an extensive plant near Kinkora, N. J. The three large mills which are being erected will give employment to some 3000 men. There will be a model hotel and restaurant, forty-eight houses with all modern conveniences, ninety houses in blocks of ten, and 600 detached houses. The streets will be 100 feet wide, paved, and will be beautified with parkways and shade trees. There will be an assembly hall, a park, school and athletic field. The company will maintain a filtered water supply, will furnish street and hotel lights, will maintain the property and attend to the disposition of the garbage. The rental of the various houses, which have been built to accommodate the several grades of workmen, will be low, as the company does not desire a profit from this part of the enterprise. The plans for the building of the city have been carried out entirely in the office of the Roebling Company Charles G. Roebling, president of the company, has devoted the greater part of his energy for the last year to carrying out this project and under his direction Isaac Harby has taken care of the details.

STEAM TURBINES IN COTTON MILL SERVICE.

That steam turbines are readily adaptable to cotton mill work is again brought out by the fact that the Francis Cotton Mills has recently adopted Westinghouse-Parsons turbines for their power plant at Biscoe, N C. This plant adds one more to the list of cotton mills using steam turbine power. Some of the plants in this field are those of the Pelzer (S C.) Manufacturing Company, 1500 kilowatts; the Oneita Knitting Mills, Utica, N. Y., 500 kilowatts; Henrietta (N. C) Mills, Gray Manufacturing Company, Charlotte, N. C.; Modena Cotton Mills, Gastonia, N. C., and the Lumberton(N. C.) Cotton Mills. These plants are now in highly successful operation.

STEAM TURBINES RUN FROM EXHAUST STEAM OF RECIPROCATING ENGINES.

Considerable interest, says "Power", is evidenced in a station at Scranton, Pa., in which a steam turbine is run by the exhaust steam of reciprocating units. The same thing is being done at the Thirteenth Street station of the Philadelphia Rapid Transit Company, and the results of the two experiments will be eagerly awaited by engineers and engine builders.

The reciprocating engines discharge more steam than the turbine can use, the turbine is simply shunted upon their exhaust line, and their freedom of exhaust is in no way retarded. The reciprocating engines would never know that the turbine was there or whether it was running or not. The turbine runs up to the right speed and gets its generator into step. It needs no governor. If it tries to go faster it will automatically take on more of the load and slow itself down. This is a safe method of feeling the way.

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ELECTRIC POWER DOORS FOR SHIP BULKHEADS.

W. B. Cowles, Cleveland, Ohio, delivered an address at the Massachusetts Institute of Technology, Boston, Mass., March 13, 1906, on "Electric Power Doors for Ships' Bulkheads." Mr. Cowles sketched briefly the evolution of bulkhead construction and the various precautions which have been developed from time to time to minimize the danger of sinking vessels as a result of collisions or injury during battle. Mr Cowles believes that no matter how patriotic the engineer and designer may be, nor how great a faith the commander of a vessel may have in the loyalty and self-sacrificing spirit of the crew, the matter of making bulkheads water-tight should be a concern entirely out of human manipulation. Mr. Cowles thinks that power doors are the only solution of the difficulty, and he has been working along this line to a point where the "Long Arm" electric power doors have been so developed by practical sea experience and continuous improvement that they are entirely successful in acting at the one weak spot in the subdivision of ships.

CANADIAN MOVEMENT TO RESTRICT USE OF NIAGARA RIVER WATER.

The twentieth annual report of the commissioners for the Queen Victoria Niagara Falls Park, just presented to the Ontario Legislature, states that the utilization of the falls for power purposes has already reduced the volume of water flowing over by about seven per cent. or from 222,400 to 205,000 cubic feet per second. Though this has caused no appreciable effect on the falls, a reduction three times as large is in contemplation. The commmissioners consider that the public agitation to restrict the further abstraction of the Niagara River water is well founded. The reports show that eleven American and six Canadian companies are at present using the falls for power purposes, and that ten more charters have been given to companies granting them power to use the falls.

ELECTRIC WATERING CARS.

According to "l'Industrie Electrique," the service of electrical street-watering carts which has been introduced into Cologne has produced favorable results. The reservoir of each of the new vehicles has a capacity of 10 c. m., against 2 c m. of those drawn by horses. Experience has shown that one electrically-propelled vehicle is capable of watering 600,000 square metres of street per day, a feat which required five horse-drawn vehicles to accomplish. The daily cost of operating the electrical vehicle is 25fr. (20s.), as against 12.5fr. (10s.) for each horse drawn cart There is therefore a daily saving of 37.5 fr. (30s.) by the introduction of the new method. Another advantage possessed by the electrical vehicle is that it may be coupled up behind a tram car in order to water the tram way route during the course of service.

ABOUT BABBITT METAL.

Babbitt metal is an alloy of copper, tin and antimony. It is soft and nearly white, and is used as an anti-friction metal. Isaac Babbitt, of Boston, patented the alloy in 1839, and the original alloy contained twenty-four parts tin, four parts copper and eight antimony. The following (Haswell's formula) gives a tougher metal: Tin ninety-six parts, copper four and antimony eight parts. Lead is also added in some cases on account of its cheapness. In small amounts it is not objectionable, but the babbitt metal that is sold in the market ready mixed usually contains a considerably larger proportion of lead than its price would indicate. The alloy is usually melted and run, while fluid, directly into the bearings, a space from an eighth to a half-inch thick being left for it between the box and the shaft that is to be supported.

Brief Interviews With Leading Manufacturers and Dealers on the Present Situation and Prospects.

Brown-Spear-Sloane Company—In conversation with Charles F. Sloane, who stated that his company had opened a temporary office in San Francisco at the Hotel Majestic, corner of Gough and Sutter streets, this being in addition to their offices in Oakland, he also, at the same time, gave a bit of news which is quite out of the ordinary, and illustrates what a bright electrical man can do in an emergency. Mr. Sloane said: "About a week after the fire I succeeded in getting a couple of friends to join with me in the purchase of the Hotel Majestic, which is at present the best—in fact about the only European plan hotel in San Francisco. We have engaged Gustav Mann, formerly one of the proprietors of the Zinkand Cafe, who will act as general manager of the entire institution. We have a very handsome dining room, which will be a feature under Mr. Mann's administration. The house has been put in order from top to bottom, and we have spent quite a little money in cleaning and renovating. We have with us some of the St Francis employees, and Mr. Walters, our room clerk, gained his experience in the Waldorf and the new Hotel Astor in New York." This information will be especially acceptable to out of town electrical men who intend visiting San Francisco on business, but are unaware that any hotel accommodations can be had in the city. We believe that the electrical fraternity would be paying a well deserved compliment to Mr. Sloane, as well as doing a good turn for their friends, in spreading this good news broadcast.

Electrical Railway and Manufacturers' Supply Company—Samuel H. Taylor says: "We shall remove next week to our new one story building at 619 Howard Street, near Second, which is directly in the electrical center. We have plenty of stock on hand to fill orders and much more is en route. All of our books were preserved. I shall continue to act as general manager of the business, a position which I have held since the organization of our company, and we shall retain all of our former agencies."

Brooks-Follis Electric Corporation—Mr. Fowden says: "We have just closed a lease on First Street, between Howard and Folsom, 75x70, and will have a one story structure completed in fifteen days. This is in the heart of the electrical center. Our former location did not afford us sufficient floor space. We are able, however, by our new arrangement, to carry a larger stock than ever before, and shall hope to take special care of our many friends and customers who have favored us with their orders before and after the recent fire."

Keystone Boiler Works—"We have re-established our offices at our old site, corner of Main and Folsom streets. Our stock of boilers and other machinery was damaged by the fire, but our works in Philadelphia are turning out Parker water tube boilers to meet all demands and with the least possible delay in filling orders."

The Pelton Water Wheel Company—"Work on our new shops at Nineteenth and Harrison streets, San Francisco, which had been under construction for two months prior to the fire, was only delayed two weeks, and a large force of men is now rushing it to completion. We expect to be in complete running order in two months, and have ordered an equipment of modern machine tools, so that our works will be even better equipped than formerly and prepared to handle machine work of all kinds. A careful inventory of records saved shows us to be in a most favorable position. All books of accounts, including cost records and cosrespondence for some years back, as also the majority of our tracings, were gotten out, to duplicate which would have been almost an impossibility. We shall remove our offices on June 15, 1907, to the Monadnock Building, San Francisco.

Chas. C. Moore & Co. Engineers, Inc.—"We have just closed a contract for an additional unit of 400 kilowatts for the Tonopah Mining Company. This plant was originally installed by us. We have also secured an order for two Babcock & Wilcox boilers for the California Powder Works."

Risdon Iron Works—Mr. Rogers said: "Our works being uninjured by the fire, we found ourselves in an unusually favorable position to meet the demands which came to us for machinery, and we have our full force of 1000 men engaged in manufacturing marine, mining and power plant machinery and in general repairing. We have also large orders for Ball engines and Heine water tube boilers, which are two of our leading specialties for steam power plant equipment."

Stanley G.-I.—"We shall remove our offices to the Atlas Building, 604 Mission Street, within ten days. We shall, however, retain our Oakland branch office for awhile at least. The Syndicate Water Company, of Berkeley, has recently installed a seventy-five horsepower Stanley induction motor in connection with a Rix compressor and a fifty horsepower Deming pump at the municipal plant at Palo Alto."

A NEW FORM OF REINFORCEMENT.

A new form of reinforcement for concrete, invented by J. G. Golding, the inventor of expanded metal, is described as a provision for connecting subsidiary reinforcing or web members to the main tension bars at any point without reducing the sectional area or tensile strength of either the main or connecting bars. The means for accomplishing this desirable result is simply to roll the bars with grooves, and then press the lips of this groove together to clasp the web members. It is stated by the inventor that the connection is so strong that in all tests so far made an attempt to pull the small bars free has always resulted in the breaking of this bar remote from the main bar. The device can be used in endlesss combinations, making it applicable to girders, columns, partitions, etc.

GLASS FLOORING FOR SWITCHBOARD STRUCTURES

In many of the switchboard galleries recently and now being erected glass flooring is being adopted, the iron framework being completely insulated by the glass lenses, the joints between which are caulked with a specially prepared, non-conducting material, thus forming a perfect insulating floor, which has the additional advantage of admitting daylight to the floor below.

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Home and Foreign News.

A STAIRWAY OF REINFORCED CONCRETE

One of the possibilities of re-inforced concrete, says the "Scientific American," is shown in the main stairway in the New York house of Mr. George W. Vanderbilt. The entire stair is supported at only one point between the floors, and that is where it abuts against the wall. All intermediate columns have thus been avoided, for these would not have been in harmony with the design. Had the stair been built of steel, it would have been impossible to obviate the intermediate supports except by making the structure exceedingly heavy and bulky, a feature which would have been objectionable.

The construction is on the Ransome system, in which the concrete is reinforced by longitudinal and transverse bars of twisted steel carried into the supports where necessary, and with the individual members, where possible, tied together by wire. The longitudinal bars, both in the body and the sides, are bent to conform to the curvature of the stair, and are continuous from the intermediate landing to the floor above and the floor below. The transverse rods are spaced short distances apart, and have their ends bent at right angels to project into the lateral flanges. The concrete construction is carried out to engage with the beams in the wall and at the second floor landing, and thus is formed an extremely solid bond.

The stair is designed for a live load of about 150 pounds per square foot, and was found to answer all requirements in a thorough series of tests, in which heavy bags of cement were dropped upon it at various points from a height of some twelve feet. The stairway was finished in marble with brass railings, and the structure has turned out to be not only a pre-eminently practical one, but an extremely handsome piece of work as well.

ELECTRIC LIGHTING IN THE FAR NORTH.

Returning to Winnipeg, Man., from the Mackenzie River district in the Northwest Territories, where he has charge of the affairs of the Hudson Bay Company, Thomas Anderson gave some details of life near the Arctic circle. The inhabitants are chiefly Indians but they are prosperous. Mr. Anderson has headquarters at Fort Simpson on the Mackenzie River. Speaking of Fort Simpson, Mr. Anderson is quoted in the Winnipeg "Free Press" of recent date as follows:

"A noteworthy feature is the fact that we have an electric light plant. The plant is operated by the engineer who has charge of the boats in the summer. The light is used for illumination in the stores, offices and dwellings and is in use all winter. When summer comes the boats are in use, and the long days render artificial light unnecessary. During the summer at Fort Simpson there is no real darkness, but about four hours of twilight. When we push down the river to the Arctic we reach the land of the midnight sun, where for weeks there is continuous day. We reach this region after a trip of about 700 miles."

PAPER GAS PIPES.

An interesting employment of paper, says Rev. de Chimie Industrielle, relates to the production of gas pipes. Manila paper cut in strips, of a width equal to the length of the pipes to be made is put into a receiver filled with fused asphalt and rolled solidly and uniformly around a rod or core of iron until the desired thickness is obtained. After the pipe thus produced has been submitted to strong pressure the exterior is covered with sand and the whole cooled in water. The core is removed and the outer surface covered with a water-proof product. These pipes, it appears, are perfectly tight and more economical than metal pipes.

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DIAMOND MATCH CO.'S ELECTRICAL EQUIPMENT.

Electric drive has been adopted throughout the lumber mills of the Diamond Match Company, at Chico, Cal., the special applications of the electric motor being in the handling of lumber and fuel. For the lumber there are installed induction motors aggregating fifty horsepower. A twenty horsepower motor unloads the green timber from the cars, a similar motor reloads the dried timber on cars as it is taken from the kilns, while one of ten horsepower handles the green lumber prior to its distribution in the yards.

STREET LIGHTING

W. F. Wilcox, Harrison, N. J., read a paper at the meeting of the Illuminating Engineers Society, May 11, entitled "High-Efficiency Incandescent Lamps for Street Lighting."

This described a new system of lighting which has been under trial for the past year or so, with reported success. In principle the system resembles the old series incandescent system of fifteen years ago, but the methods of controlling the current and cutting out burned-out lamps are different. For controlling the current, the constant current transformer developed for series arc lighting is used, and as this is a sensitive device, a steady current is maintained. An automatic cut-out in the socket short circuits a lamp if the filament breaks. The lamps employed are of the new metallized filament type, which is considerably more efficient than the old treated filament lamp, and has other important advantages. The advantages of the series incandescent system for street lighting are the use of low candle-power units, giving an efficient distribution, and the ability to use high line voltage for securing an inexpensive distribution system. Until the constant-current transformer had been adapted to this work the system was not satisfactory, but the excellent regulation given by this device not only affords a reliable system, but enables the metallized filament lamp to be employed. This lamp can be made with an efficiency as high as 2.5 watts per candle-power, with a life equal to that of the 3.5 watt per candle-power treated lamp. This is a gain of 30 per cent. In the older type of lamp 55 per cent. of the loss in candle-power was due to blackening of the bulb, the rest being due to an increase in the resistance of the filament. With the metalized filament but 25 per cent. is due to the blackening of the bulb, the rest being due to the resistance changes. On a series lighting system, however, the current is maintained constant, so that the candle-power rises with time after a slight drop. Curves were shown illustrating this effect. On account of it, it is permissible to allow the lamps a longer life, say, until the candle-power, measured at the initial voltage, falls to 70 or 75 per cent. of its first value.

When the new system is to be adopted one must decide what efficiency of lamp is the most suitable. This can easily be computed when the lives and the cost of power are known. An instance was given as an example, and it was figured out that the best results would be obtained by using a metallized filament lamp with an efficiency of 2.7 watts per candle, which would cost forty cents, the cost of power being assumed as two cents per lamp-hour. The time of burning was 4,000 hours a year. The standard intensity is twenty five candles. Such an installation was compared with a corresponding one using the old type of lamp. It was shown that there was a saving of $8.03 per lamp in favor of the new lamp. There are now forty varieties of series lamps to select from. It is advisable to use circuits containing not less than 100 lamps, with voltages of from 1,000 to 5,500. The best results are obtained with low candle power lamps of from one and one-half to three amperes, preferably one and three-quarters amperes, though if arc lamps must be used, six or six and one-half amperes lamps can be had. With the larger current lamps there is some difficulty in exhausting the globe.

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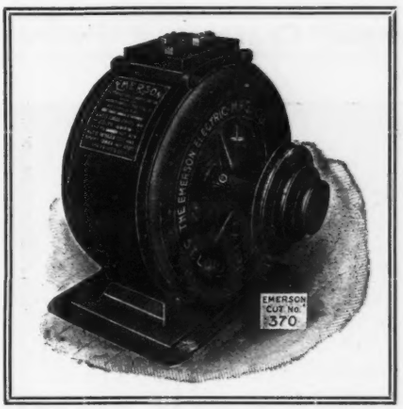

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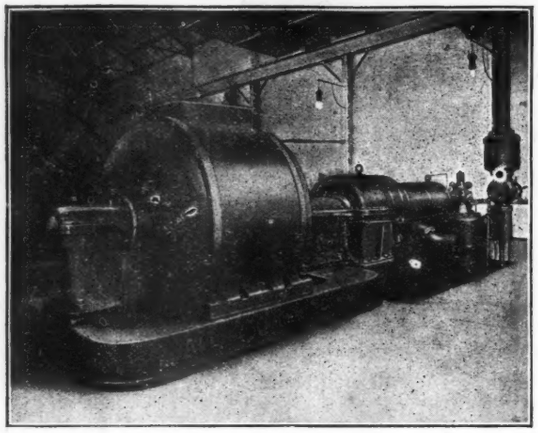

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ELECTRICITY IN THE HOME

The electric motor, says the "Electrical Review," N. Y., is becoming more and more a household necessity. Its first use was naturally to replace human exertion, such, for example, as driving a sewing machine. Next it displaced the manually driven fan, and supplied a source of comfort in the summer months that goes a long way toward relieving the dog days of their trials. But it has not by any means stopped here, for long flights of stairs have to-day lost their terrors, because the electric elevator is so easily installed; in fact, the control of these elevators can be made so perfect that no attendant is needed, as the passenger may run them safely.

Electric hair-driers are now available for those who need them, and electric vibrators for those whose systems are benefited by such stimulation. It will probably not be long before electric sweepers can be purchased, which will not only make that labor easy, but entirely prevent stirring up dust.

In the nursery and sickroom electric milk warmers and devices for heating water are becoming a necessity, while the easily-regulated electric pad threatens to entirely displace the hot-water bag. Electrically heated curling irons, electric cigar lighters, electric chafing dishes, etc., are but a few of the many electrically heated devices now in common use. Electric flatirons are now quite extensively used in the kitchen and sewing room Travelers find them most useful for pressing out clothing that has been mussed or creased in packing, ladies find them useful for ironing out flimsy shirtwaists and lace collars and cuffs which they would not dare intrust to the usually careless laundress. Outside of the household, electric flatirons are commonly used in tailoring shops of all classes, and even architects and engineers have begun to employ them for smoothing out blue-prints and plans. Small electric refrigerating plants are provided to do away with the inconvenience of hauling ice into the house. The electric dishwasher has been introduced, the dishes being piled into an open wire basket and dipped into boiling water which is whirled rapidly against them by an electric motor. The entire operation requires but a few minutes. The knives can be scoured and polished by passing them between a pair of rapidly rotating buff-wheels, and an emery wheel is provided for sharpening the steel blades. But the use of the electric motor in the kitchen is not confined to cleaning apparatus. A number of electrically-driven machines have been devised for preparing food. One of them consists of a cabbage-chopping machine, and the other is a potato-paring machine. The latter discharges potatoes fully pared except for the eyes, which can readily be cut out.

A TELEPHONE SUGGESTION.

Everybody, says the "Detroit Free Press", puts the telephone receiver to the left ear. No one, in using the telephone, ever listens with the right ear. It is always the left.

The receiver is hung on the left side of the phone. Hence we have to use the left ear in talking, unless we want to inconvenience ourselves.

The receiver was originally hung at the left so the left hand could manage it. The right hand, in the early days of telephoning, had all it could do to turn the crank.

Now the right hand is idle in telephoning. Therefore, for anyone desiring it, it would be possible to hold the receiver to the right ear. The companies should take this fact into consideration, and should hang the receiver, not on the left or right of the instrument, but directly in front of it. Then we could use in telephoning, whichever ear we preferred to.

News Notes.

Washington, D. C.—Secretary Taft sent Congress an estimate of $5,000 to repair the damage to fortifications surrounding San Francisco by the recent earthquake. With this sum it is proposed to patch the cracks in gun emplacements and other structures. Three hundred thousand dollars has already been appropriated for such fortifications.

Seattle, Wash.—Frank J. Bentley, traffic manager of the Illinois Steel Company, and member of the delegation sent out by the steel corporation to investigate conditions at San Francisco states as a result of the investigation 90 per cent. of the steel consumers of San Francisco will be extended unlimited credit in the rebuilding of that city. In the report of the investigation which will be submitted to the United States Steel Corporation it is estimated that 250,000 tons of steel will be used in a period extending over five years.

Anaheim, Cal.—The Valley Home Telephone Company being organized here will establish a system covering all of Northern Orange county, comprising the cities and districts of Anaheim, Fullerton, Placentia, Buena Park, La Habra, the Fullerton oil fields, Garden Grove, West Anaheim, Brookshurst, Yorba, Benedict, Miraflores and Claire. George and Robert Dunn are securing subscribers, and they report having received seventy in Fullerton. Mr. Hubbard, a Redlands capitalist, will take a large portion of the bond issue as soon as 500 subscribers have been obtained. There will be but one central office and no switching fees in this end of the county will be charged. Arrangements have been made to connect with the Home Telephone Company for all outside switching. About $125,000 will be expended to install the system in this district.

Albany, Or.—The temporary injunction against the Home Telephone Company, granted at the instance of the Pacific States Telephone Company, was dissolved by Judge William Galloway, and the Home Company is again at work installing its system in this city.

Judge Galloway held that the Pacific States Company had no right to attack its rival in regard to its franchise, for that was a matter entirely between the Home Company and the city officials, and that the plaintiff company did not substantiate the other claims in its complaint.

Montreal, Canada—The Canadian Westinghouse Company, Ltd., is supplying the Provincial Light, Heat and Power Company with apparatus to be used in the development of another large water power plant near Montreal. The initial installation will consist of three 3750-kilowatt revolving field, alternating current, water wheel driven generaters of 4000 volts, three-phase, 7200 alternations; also twelve 2500-kilowatt, 44,000 volts oil insulated, water cooled transformers. This new power station will be used for supplying additional power to the Montreal Light, Heat and Power Company at Montreal. The step-up transformers will be wound for 4000 to 44,000 volts, and the lowering from 40,000 to 12,500 volts. The transmission line is about forty miles in length.

Pine Creek, O.— The California and Oregon Light, Heat and Power Company is contemplating the installation of a larger power plant to furnish light and power to the towns of Surprise and Goose Lake Valley. The company will spend $2,000 in improvements.

Ashland, O —The county court of Jackson county, the municipalities of that county and Grants Pass, in Josephine county, have under consideration applications for electric railway franchises through the streets of the cities and towns, by the Condor Water and Power Company, Dr. C. R. Wray, president.

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The Philadelphia Rapid Transit Company are building one of the largest and best equipped power stations in the world. It is to contain sixty-four Parker Double Ended Superheater Boilers over automatic stokers. Each boiler will develop 1000 boiler horsepower without being forced, making over 100,000 engine horsepower for the station. This is the fifth order from this company, which already had over 10,000 horsepower of these boilers in use.

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Van Emon Elevator Co.
46-54 Natoma St. San Francisco

Our eight elevators in Mr. H. E. Huntington's "Pacific Electric (Railway) Bldg." Los Angeles, Cal., we refer to as a Model Elevator Installation.

Eugene, Or.—The Eugene city Council practically agreed to grant the Willamette Valley company a franchise to construct and operate a system of street railways in this city. Several changes and additions to the ordinance granting the franchise, which will undoubtedly be acceptable to the company have been made and the matter will come up for passage at the next Council meeting. As amended the ordinance is favored by all members of the Council. The proposed ordinance provides that work on the system shall be commenced within six months from the date of the approval of the ordinance and be completed within thirty months. It provides that a line from the Southern Pacific depot to the University of Oregon, a distance of over one mile, shall be constructed by September, 1907. The life of the franchise is to be thirty-five years. The company announces its intention, as soon as the franchise is granted, to begin work on an electric railway between Eugene and Springfield, three miles distant, the line to be a part of the Eugene street railway system. It is also known that the company intends to build a steam railroad to the Blue River mines, although no official announcement of the enterprise has been made. Surveyors have already begun work on the companys' proposed electric railroad between Salem and Eugene. Commencing at Eugene they are working north.

Bozeman, Mt.—A company has been organized by F. T Osborne, T. H. Mehlberg and W. W. Livingston of Bozeman, D. A. Morrison of Whitehall, E. C. Davis of Sheridan, and George Mackay of Olympia, Wash., to manufacture Portland cement; capital stock $600,000.

Tacoma, Wash.—Articles of incorporation of the Tacoma Gas Light company with a capital stock of $1,000,000 have been filed; incorporators, B. S. Grosscup, Frederick C. Brewer, Frank D. Nash, Harry B. Wales of Grand Rapids, Mich., and J. Lathrop Mottley of Boston, Mass. The company plans to build a new gas and electric lighting plant.

Red Lodge, Mont.—The Bear Creek Water Company has been incorporated by Christian Yegen, Theo. T. Lamport and Frank H. Church; capital, $60,000, to furnish the town of Bear Creek with water and electric light. The installation of a gas works is also contemplated.

Bellingham, Wash.—The Columbia Improvement Company has received seventy tons of seven-strand aluminum wire for its transmission line for the big power plant which it is constructing at Nooksack Falls.

New Westminster, B. C.—General Manager Sperling and General Superintendent Milne, of the B. C. Electric Railway Company went to Ladner to complete plans for the installation of the electric lighting system there. Work will be commenced at once.

Tacoma Wash.—Two rival electric companies have started interurban railways from Tacoma to Olympia a distance of thirty miles. The Tacoma Railway and Power Company, owning Tocoma street railways, is seeking a franchise through South Tacoma for an extension to American Lake and Olympia. The Pacific Traction Company is now building through South Tacoma under a franchise granted last year.

Seattle, Wash.—The Cascade Gas and Electric Fixture Company was awarded the contract for installing the electric fixtures in the new public library by the library board at $2,368.

Seattle, Wash.—The Independent Telephone Company is planning to spend several thousand dollars placing its wires underground in the vicinity of Union street and is enlarging and improving its system in the center of the city.

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PORTLAND, OR.
336 SHERLOCK BUILDING
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Portland, Or.—Articles of incorporation have been filed by the Standard Electric Company with a capital of $15,000 by John C. Baird, Frank E. Harmar and Fred A. Waltz. The company will deal in electrical and gas fixtures and equip power plants.

Spokane, Wash.—D. T. Ham of the Pend d'Oreille Development Company of this city, received word from Congressman W. L. Jones that the bill granting the company the right to construct a big power plant near Metalline, Wash., had passed both the senate and the house.

Star, Idaho—William A. Lawrence and others have incorporated the Local Telephone Company with a capital of $20,000 to build and operate nineteen miles of telephone lines.

Wenatchee, Wash.—Jay P. Graves of Spokane, and Dr. N. G. Blalock of Walla Walla, are planning to establish a large power plant at Chelan Falls to develop 100,000 horse power.

Spokane, Wash.—Edgar A. Torrence and others propose to develop water power near Big Falls, Wash.

Wesler, Wash.—The Interstate Electric Power Company has been organized to construct a dam and power plant at Eagle Rock on Snake River capable of developing 20,000 horse power.

Boise, Idaho—W. E. Foran, representing the San Francisco, Idaho and Montana railroad, has left for Portland to secure an engineering corps to make a permanent survey of the new line. Grading will begin as soon as the survey is completed.

McMinnville, Or.—The contractors for the new water system for McMinnville have the pipe connected from the Berry spring and from the Cowles Creek supply to the catch basin, and turned the water in under pressure to that point. The pipe is also laid down to the reservoir on the Hembree hill. It is expected that the contractors will have the pipe laid to the city and completed by September 1.

Los Angeles, Cal—Mr. Harriman has for some time been planning to spend millions on a subway and surface line from this city to the seashore. The expenditure may be forty millions, and the system will be a marvel of rapidity and convenience. It is stated that the tunnel will be of reinforced concrete nearly forty feet wide and that the cars will be operated by electricity.

Aurora, Or.—The Aurora Electric Company is making arrangements to install a day service on its entire system. The company now furnishes the power for Aurora, Barlow, Canby, Hubbard and has Gervais all wired. With the day service the company will put in a large number of fans in the above cities, and a number of contracts have been made for the installation of motors and electric flatirons.

Portland, Or.—The Oregon Electric Railway Company have been incorporated for $2,500,000 by Thomas Scott Brooke, H. L. Corbett and R. W. Lewis.

Portland, Or.—The Mount Hood Electric Company has been incorported for $50,000 by S. B. Cobb, C. W. Pallett and C. W. Miller.

San Francisco, Cal.—The L. S. Starrett Company contributed $1000 cash to the general relief fund for the sufferers by the San Francisco fire. When appealed to for tools for the machinists, the company declined on the ground that such contributions might displease its patrons on this Coast, but instructed its Pacific Coast agent, W. H. Stanley, to issue these tools to the amount of $2000, and the dealers are instructed to use the orders in payment of their accounts with the Starrett Company.

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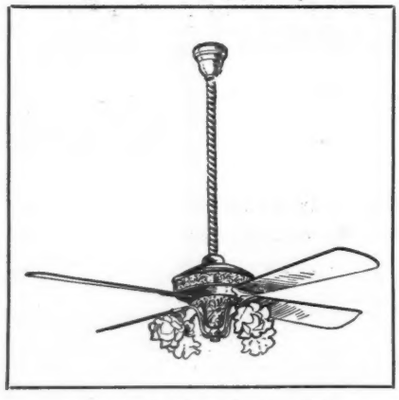

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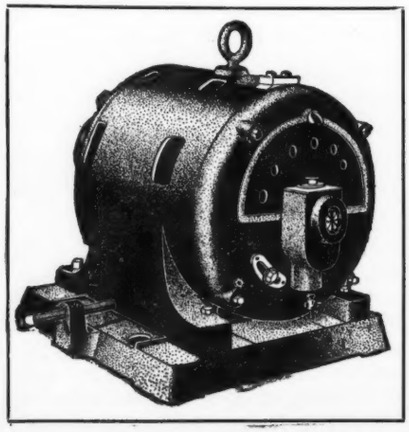

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